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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,541	07/22/2003	Tsuyoshi Shibata	01272.020609.	4875

5514 7590 03/14/2007		EXAMINER
FITZPATRICK CELLA HARPER & SCINTO		HUFFMAN, JULIAN D
30 ROCKEFELLER PLAZA		

ART UNIT	PAPER NUMBER
2853	

NEW YORK, NY 10112

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/14/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

	Application No.	Applicant(s)
Office Action Summary	10/623,541	SHIBATA ET AL.
	Examiner	Art Unit	
	Julian D. Huffman	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>11 January 2007</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-12 and 15-22* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-12 and 15-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the

fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection.

Since this application is eligible for continued examination under 37 CFR 1.114,

and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the

previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on 15 November 2006 has been entered.

Claim Rejections - 35 USC § 102

2.   The following is a quotation of the appropriate paragraphs of 35

U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3.   Claims 1, 7-9, 12, and 18-20 are rejected under 35 U.S.C. 102(e) as being

anticipated by Silverbrook (U.S. 6,575,549 B1, cited in previous rejection).

Silverbrook discloses:

With regards to claims 1 and 12, an inkjet printing method and apparatus using a printing head (fig. 1) having a plurality of nozzles (A-N) capable of ejecting ink for printing an image by ejecting ink based on printing data which instructs ejection or non-ejection of ink, the plurality of nozzles being aligned next to each other along a predetermined direction, wherein

compensation means (column 1, line 55) performs the step of adding the printing data corresponding to an abnormal nozzle malfunctioning in ink-ejection (nozzle h) to the printing data corresponding to a neighboring nozzle of the abnormal nozzle (nozzles G or I, fig. 3, column 3, lines 2-12) based on a landing state of ink ejected from the neighboring nozzle (column 2, lines 56-62, landing states of ink ejected from nozzles are checked and neighboring nozzles would only be used for compensation if they are functioning properly),

when an N-th nozzle of the plurality of nozzles is an abnormal nozzle, a neighboring printing area neighboring a printing area to be printed by the N-th abnormal nozzle is printed by using an (N-M)-th neighboring nozzle (G) and an (N+M)-th neighboring nozzle (I, where N and M are positive integers) arranged in the neighborhood of the N-th abnormal nozzle based on the printing data corresponding to the N-th abnormal nozzle (column 3, lines 5-12, for a given print area, nozzles G and I on either side of nozzle H take turns printing the data of nozzle H), and

the printing data corresponding to the N-th abnormal nozzle is alternately added to the printing data corresponding to the (N-M)-th neighboring nozzle and the (N+M)-th neighboring nozzle every time the printing data corresponding to the N-th abnormal nozzle is present (column 3, lines 13-16);

the landing state is a landing state of ink ejected from the (N-M)-th

neighboring nozzle and the (N+M)-th neighboring nozzle, and is obtained from at

least one of information about deviation of a landing position of ink on the printing

medium from a normal landing position and information about a diameter of a dot

formed by ink landed on the printing medium, (column 2, lines 54-62), and

abnormal nozzles include nozzles incapable of ejecting ink and nozzles

whose landing state of ink is not normal (column 2, lines 56-62).

With regards to claims 8, 9, 19 and 20, means for or step for completely

printing an image in a predetermined area of a printing medium by a single

movement of a single printing head relative to the printing medium while ink is

ejected out of the nozzles of the single printing head based on the printing data

(column 2, lines 39-42).

With regards to claims 7 and 18, Silverbrook further discloses that when

the printing data corresponding to the N-th abnormal nozzle is added to that

corresponding to the (N-M)-th neighboring nozzle and the (N+M)-th neighboring

nozzle, a printing resolution of the printing head is improved by increasing an

ejection frequency of ink (compare figs. 2 and 3, further since the abnormal

nozzle may not eject ink at all, printing using the neighboring nozzles increases

the frequency of ejection of ink).

4.   Claims 7 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated

by U.S. 6,481,816 B1 to Oyen.

Oyen discloses:

.With regards to claim 7, an inkjet printing method and apparatus using a printing head (fig. 1, element 3) having a plurality of nozzles (7) capable of ejecting ink for printing an image by ejecting ink based on printing data which instructs ejection or non-ejection of ink, the plurality of nozzles being aligned next to each other along a predetermined direction (fig. 1), comprising:

compensation means (fig. 2, element 14) for/step of adding the printing data corresponding to an abnormal nozzle malfunctioning in ink-ejection to the printing data corresponding to a neighboring nozzle of the abnormal nozzle (abstract);

when an N-th nozzle of the plurality of nozzles is an abnormal nozzle, a neighboring printing area neighboring a printing area to be printed by the N-th abnormal nozzle is printed by using an (N-M)-th neighboring nozzle and an (N+M)-th neighboring nozzle (where N and M are positive integers) arranged in the neighborhood of the N-th abnormal nozzle based on the printing data corresponding to the N-th abnormal nozzle (figs. 5a-5d, column 6, lines 2-25), and

when the printing data corresponding to the N-th abnormal nozzle is added to that corresponding to the (N-M)-th neighboring nozzle and the (N+M)-th neighboring nozzle, a printing resolution of the printing head is improved by increasing an ejection frequency of ink (compare figs. 5b and 5c, wherein resolution is improved when compared to the image that would be printed without correction).

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for

all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described
> as set forth in section 102 of this title, if the differences between the subject matter sought to
> be patented and the prior art are such that the subject matter as a whole would have been
> obvious at the time the invention was made to a person having ordinary skill in the art to which
> said subject matter pertains. Patentability shall not be negatived by the manner in which the
> invention was made.

6.   Claims 10 and 21 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Silverbrook in view of Su (5,929,875).

Silverbrook does not expressly disclose varying the manner of adding print

data of the abnormal nozzle to the neighboring nozzle depending on type of print

medium.

Su et al. teach adjusting the drop size based on the type of print medium

(column 3, lines 22-24 and column 24, lines 12-18).

It would have been obvious to one having ordinary skill in the art at the

time of the invention to modify Silverbrook to adjust the print data depending on

the type of print medium, as taught by Su et al., for the purpose of

accommodating for different ink absorption properties of various media types

(column 24, line 18).

7.   Claims 11 and 22 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Silverbrook in view of Oyen.

Silverbrook discloses printer diagnostics that determines if a nozzle is

functioning properly (column 2, lines 53-56).

Silverbrook does not disclose the details of the printing diagnostics, or means for/step of printing a correction pattern on a printing medium by using the printing head, the detection pattern being for use in detecting the state of the nozzles and detecting means for/step for detecting the abnormal nozzle based on the detection pattern printed on the printing medium.

Oyen discloses means for/step of printing a detection pattern on a printing medium by using a printing head and, detecting the state of the nozzle and detecting means for/step of detecting the abnormal nozzle based on the detection pattern printed on the printing medium (column 8, lines 38-45).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify Silverbrook to include printing means for causing the printer to perform the step of printing a detection pattern and detecting means for causing the printer to perform the step of detecting an abnormal nozzle based on the detection pattern printed, as taught by Oyen, for the purpose of providing a means to detect abnormal nozzles.

8.   Claims 4-6 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oyen in view of Bland (6,278,469).

Oyen discloses:

With regards to claims 4 and 15, an inkjet printing method and apparatus using a printing head (fig. 1, element 3) having a plurality of nozzles (7) capable of ejecting ink for printing an image by ejecting ink based on printing data which instructs ejection or non-ejection of ink, the plurality of nozzles being aligned next to each other along a predetermined direction, comprising,

compensation means (fig. 2, element 14) for/step of adding the printing data corresponding to an abnormal nozzle malfunctioning in ink-ejection to the printing data corresponding to a neighboring nozzle of the abnormal nozzle (abstract),

when an N-th nozzle of the plurality of nozzles is an abnormal nozzle, a neighboring printing area neighboring a printing area to be printed by the N-th abnormal nozzle is printed by using an (N-M)-th neighboring nozzle and an (N+M)-th neighboring nozzle (where N and M are positive integers) arranged in the neighborhood of the nozzle based on the printing data corresponding to the N-th abnormal nozzle,

the printing data corresponding to the N-th abnormal nozzle is added to the printing data corresponding to the (N-M)-th neighboring nozzle and the (N+M)-th neighboring nozzle (figs. 5a-5d, column 6, lines 2-25).

Oyen discloses that the amount of ink deposited by the neighboring nozzles may be adjusted (column 6, lines 18-25).

Oyen does not expressly disclose compensation means for causing the printer to perform the step of adjusting the ratio of the printing data corresponding to the N-th abnormal nozzle to be added to the printing data corresponding to the (N-M)-th neighboring nozzle and the (N+M)-th neighboring nozzle based on landing states of the (N-M)-th neighboring nozzle and the (N+M)-th neighboring nozzle, the states obtained based on information regarding the landing position and diameter of the neighboring nozzle as obtained from a test print.

Bland et al. discloses performing a test print on print medium, determining the landing states, including landing position and diameter information, of the

nozzles, and adjusting the ratio of ink deposited based on the states (abstract).

Further, Bland et al. teach that the technique may be applied to any ink jet printer

(column 11, line 67).

It would have been obvious to one having ordinary skill in the art at the

time of the invention to provide compensation means in Oyen which causes the

printer to perform the step of adjusting the ratio of printing data based on landing

states of the nozzles, as suggested by Bland, for the purpose of improving print

quality without reducing throughput.

Response to Arguments

9.   Applicant's arguments have been fully considered but they are not

persuasive. Silverbrook states that it is assumed that all other nozzles are

operating correctly, and only nozzle h is not operating correctly. Silverbrook

further assumes that the diagnostic systems of the printer have detected that

nozzle h is not functioning properly. Clearly, all nozzles have been checked by

the diagnostic system and the neighboring nozzles would not be used to

compensate for nozzle h if they were also malfunctioning. Thus, the printing data

of Silverbrook is adjusted based on the landing states of the nozzles. Applicant's

statement that Silverbrook does not explain how to perform correction when

neighboring nozzles are also malfunctioning is irrelevant to the claimed invention.

It is further noted that this feature is suggested by Bland.

Applicant's argument that the does the references do no increase the

resolution is not clear, as it is clearly shown in the cited figures.

Applicant's argument of Oyen and Bland fails to consider the combination provided in the rejection. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).
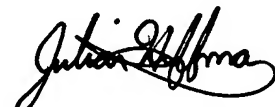
Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian D. Huffman whose telephone number is (571) 272-2147. The examiner can normally be reached on 10:00a.m.-6:30p.m. Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Julian D. Huffman
Primary Examiner
Art Unit 2853
3 March 2007